



MISSOURI. Conservationist

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[NOTE TO OUR READERS]

Go Outside and Play This Summer

School is out. Summer is here. And so begins the challenge of keeping school-age kids busy and active. For a nostalgic parent like me, it seems this might have been easier when electronic devices weren't

persistently present and only an arm's length away; the days when going outdoors was the ONLY way to interact with your friends or to play out imaginary adventures. But if I am honest with myself, I remember that my mother and grandmothers spent quite a bit of time and energy getting me, my siblings, and my cousins away from the television and into the outdoors. "Go outside and play!" was a phrase we heard year-round, but never so much as during the summer months when long, warm days meant there was plenty of opportunity to focus our restlessness away from the house and on the great outdoors.

I realized some time ago that I have to be persistent in the same way my mother and grandmothers were if I want my kids to, "Go outside and play!" My kids and I aren't living in a community like the one of my youth, where our rural neighborhood provided access to a river, a pond, and hundreds of acres of forest and open land just outside our door. I have to be more organized in my approach and determined in my efforts to look for outdoor opportunities that fit our family schedule and are accessible to our more urban community.

When my kids were toddlers, we made regular trips to our nearest conservation nature center. Slow walks on trails, wildlife viewing, and participating in programs were fantastic ways for my little ones to go outside and play and discover nature. As the kids got a little older and holding hands wasn't as necessary (or desired), we would go for harder hikes on conservation area trails where they could break away from me a little and navigate independently, something that wasn't allowed when we walked in town. At first, going ahead solo made them a little nervous, but realizing they could get up and down the trail and always come back to find me gave them confidence and a sense of accomplishment. Those ex-



periences made going outside to play exciting for them and rewarding for me.

Keeping kids busy and active throughout the summer can be challenging. All of us here at the Department of Conservation want to help you find ways to get you and your kids outdoors. The Department offers outdoor skills classes and educational programs for kids of all ages. We manage over 1,000 conservation areas across Missouri for your use. Visit our website and the "Things to Do" section (nature.mdc.mo.gov/discover-nature/activities) to see all the ways we help you and your family "Go outside and play!"

Jennifer Battson Warren, deputy director

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by Isabeau Dasho and Bob DiStefano

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by Scott Sudkamp, photographs by David Stonner

Take your archery skills to the water this summer for a hopping good time

Cover: A waterfall at Mina Sauk Falls.

Learn about nature's true value starting on

Page 10. Photograph by David Stonner.

📷 24–70mm lens • f/11 • 1.6 sec • ISO 100

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WHAT IS IT?

Our photographers have been busy exploring the intricacies of outdoor Missouri. See if you can guess this month's natural wonder. The answer is revealed on Page 8.



NOPPADOL PAOTHONG

MORE TO MILKWEED

Twenty-five years ago I planted wildflowers in my garden, including milkweed, butterfly weed, horsemint, and varieties of asters, goldenrod, coneflowers, and blazing stars. Over the years, only once or twice did a monarch butterfly use the milkweed for a food source or to lay eggs; however, the bumblebees loved them and so do I.

On several occasions, when the wind was just right and I had guests on my patio, someone would ask about the fragrance. I would tell them it was the milkweed and have them go take a sniff. It reminds me of cinnamon and sugar. Plant milkweed for the monarch butterflies, but please stop and smell the milkweed's wonderful fragrance.

Robt C. Kramer, Affton

MOREL IN THE MESH

I enjoyed your article on morels [April; Page 5], but you forgot the most important part of hunting them. Never use a plastic bag or a bread sack. Always use a mesh bag. It helps the spores escape.

Richard Stukes, Freeman

TROUT FISHING

Mark Van Patten's article in the April issue was superb [*Mastering Missouri's Trout in the Wild*; Page 22]. It condensed volumes of trout fishing books and videos into a concise reference to keep and to share. Additionally, David Stonner's photographs were outstanding, as usual.

Troy Hall, via email

Enjoyed the article *Mastering Missouri's Trout in the Wild* by Mark Van Patten in the April issue. Even though I have fished for wild trout for many years, I continue to learn. The article contains many good lessons and points that even experienced anglers can use. We are fortunate to have wonderful trout waters in Missouri and outstanding MDC staff.

George Bohigian, M.D., St. Louis

PLEASED SUBSCRIBER

I am writing to tell you what a great magazine that you have. There are so many interesting topics inside that you just can't find anywhere else. I think the educational aspects of your work are fantastic, and the *What Is It?* pictures are always a blast to try and solve. Thank you for what you do.

Christian Gonnella, via email

I love this magazine. I also have it sent to my brother in Houston, and he loves it, too. I like that it is still on paper. It is nice to take with me as reading material when I'm away from the house. The online is nice if I want to share an article with a friend, so please keep both. The pictures are beautiful and better on paper. We are born and raised Missouri residents, and love our beautiful state and its parks. Please keep up the great work that the Conservation

Department does and the wonderful magazine. Every issue has something that I did not know or a new place to visit.

Dawn Bickford, Warson Woods

AN APP FOR THAT

Just wanted to say thanks for the MDC app. So convenient to purchase permits and not have to worry about keeping track of my permits. Absolutely love the functionality. Well done.

Brennan Lehman, via Facebook

WATERFOWL AT COOLEY

Thanks for the beautiful Cooley Lake Conservation Area [16800 Settle Station Road, Platte City]. I took my 2-year-old out there and had a great time watching waterfowl.

Matthew Gooch, via Facebook

Reader Photo



COMING DOWN

Nathan McDermott captured this photo of a western ratsnake — also known as a black ratsnake — climbing down a large oak tree in his front yard in Washington, Missouri. McDermott, who is working on a master's degree in environmental health, considers himself an avid photographer. "If I'm outside, I always have my camera with me," said McDermott. "Black ratsnakes are one of the species we most commonly find around our house," he said. "This one was nearly 5 feet long." As one of our state's largest and most familiar snakes, western ratsnakes are welcome by many, as they help control pest and rodent populations.



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Instagram: [instagram.com/moconservation](https://www.instagram.com/moconservation)
Kids' site: XplorMo.org

Missouri Conservationist: mdc.mo.gov/conmag
Missouri Department of Conservation: mdc.mo.gov
Nature Shop: mdcnatureshop.com
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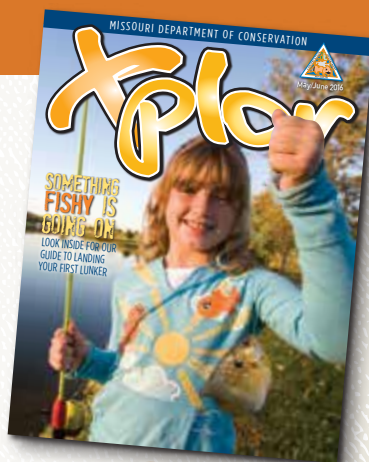
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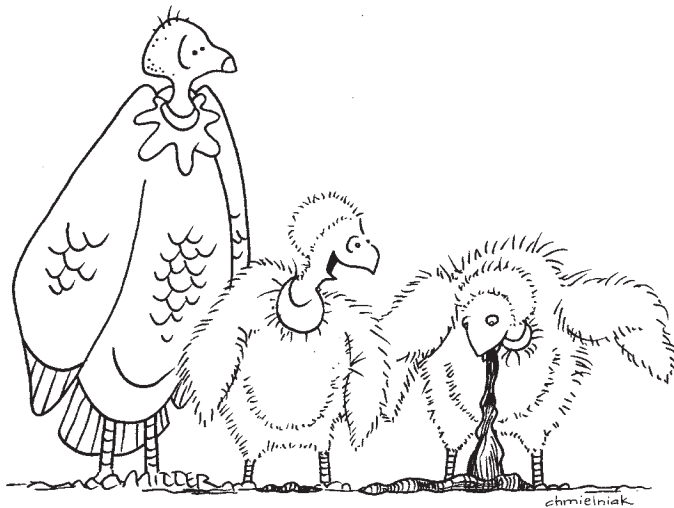
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"Dad said the 'Five Second Rule' doesn't apply to us vultures."

Agent Notes

Get Out and Catch Those Cats

THERE IS NOTHING better than being outdoors in the early summer. This is my favorite time of year. The air is warm, the birds are singing, frogs are croaking, and the best part is the catfish are biting.

Missouri offers incredible opportunities to fish for channel, blue, and flathead catfish. Whether you are a serious angler out for the monster cats or just want to spend a lazy day on the dock, bank, or boat, the options are endless. If you prefer fishing on the river, the mighty Mississippi is quite the experience. If you are like me and enjoy fishing impounded waters, visit one of the state's many lakes and reservoirs, such as the Lake of the Ozarks, Bull Shoals, or Table Rock.

The Missouri Department of Conservation offers another popular option — stocked lakes. For example, August A. Busch Memorial Conservation Area, located in the St. Louis Region, has more than 30 lakes, many stocked with channel catfish.

There are many methods used for catching catfish. I am a pole-and-line gal myself, but that is just the beginning. Trotline, throw line, limb, bank, and jug lines are all acceptable methods. Check out huntfish.mdc.mo.gov/fishing for specific regulations and areas.

Lexis Riter is the conservation agent for Jefferson County. If you would like to contact the agent for your county, phone your regional conservation office listed on Page 3.



HUNTING & FISHING CALENDAR

FISHING	OPEN	CLOSE
Black Bass		
Impounded waters and most streams north of the Missouri River	All year	None
Most streams south of the Missouri River	05/28/16	02/28/17
Bullfrogs and Green Frogs	06/30/16 at sunset	10/31/16
Nongame Fish Giggling		
Impounded Waters		
*sunrise to sunset	02/01/16	09/14/16
*sunrise to midnight	09/15/16	01/31/17
Streams	09/15/16	01/31/17
Paddlefish on the Mississippi River	09/15/16	12/15/16
Trout Parks		
Catch-and-Keep	03/01/16	10/31/16
Catch-and-Release	11/11/16	02/13/17
HUNTING	OPEN	CLOSE
Coyote (restrictions apply during April, spring turkey season, and firearms deer season)	All year	None
Deer		
Archery	09/15/16 11/23/16	11/11/16 01/15/17
Firearms		
Early Youth Portion	10/29/16	10/30/16
November Portion	11/12/16	11/22/16
Late Youth Portion	11/25/16	11/27/16
Antlerless Portion (open areas only)	12/02/16	12/04/16
Alternative Methods Portion	12/24/16	01/03/17
Groundhog (woodchuck)	05/09/16	12/15/16
Pheasant		
Youth	10/29/16	10/30/16
Regular	11/01/16	01/15/17
Quail		
Youth	10/29/16	10/30/16
Regular	11/01/16	01/15/17
Rabbit	10/01/16	02/15/17
Squirrel	05/28/16	02/15/17
Turkey		
Archery	09/15/16 11/23/16	11/11/16 01/15/17
Firearms		
Fall	10/01/16	10/31/16
Waterfowl	see the <i>Waterfowl Hunting Digest</i> or on.mo.gov/150tdXu	

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code* and the current summaries of *Missouri Hunting and Trapping Regulations* and *Missouri Fishing Regulations*, *The Spring Turkey Hunting Regulations and Information*, the *Fall Deer and Turkey Hunting Regulations and Information*, the *Waterfowl Hunting Digest*, and the *Migratory Bird Hunting Digest*. For more information, visit on.mo.gov/1Ulcnlw or permit vendors.

Ask MDC

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Midland watersnake



Northern watersnake

How can I tell the difference between northern and midland watersnakes?

Northern watersnakes (*Nerodia sipedon sipedon*) and midland watersnakes (*Nerodia sipedon pleuralis*) are two closely related subspecies that can be difficult to differentiate. Although northern watersnakes can be found in almost every county in the upper two-thirds of the state, they are gradually replaced by midland watersnakes the farther south you go.

Because their color varies and darkens with age, correctly identifying northern and midland watersnakes can be tricky. However, knowing a few traits can help.

A northern watersnake tends to be gray to brown with numerous dark

brown bands along the first third of its body. The bands lose definition toward the tail, resembling blotches. Its dorsal cross bands are reddish brown, dark brown, or nearly black. The color of the belly varies, but generally is a combination of cream or yellow, marked by irregularly spaced half-moons.

The midland watersnake is tan or reddish brown with similarly colored cross bands and blotches. Some are almost orange with brown markings. The belly is usually yellow with irregularly spaced orange, red, or brown markings.

Watersnakes prefer aquatic habitats, such as creeks, rivers, sloughs, ponds, lakes, and swamps. Midland watersnakes particularly enjoy the clear, cool gravel bed creeks typical of the southern Missouri Ozarks.

As with all harmless watersnakes native to Missouri, both northern and midland watersnakes are often misidentified as venomous western cottonmouths or copperheads and needlessly killed. The cottonmouth and copperhead are pit vipers, so they have distinct facial pits between the eyes and nostrils and diamond-shaped heads. In contrast, watersnakes have rounded heads and lack the facial pits of their venomous counterparts. Also, cottonmouths are not good climbers, while watersnakes bask in the sun, high on tree limbs.

What kind of salamander is this?

This is a mudpuppy (*Necturus maculosus*).

Totally aquatic their entire lives, mudpuppies have slender brown-to-gray bodies and feathery pink or red gills fluttering from their necks. Unlike most other salamander species that lose their gills as they mature, mudpuppies retain their gills permanently.

Mudpuppies live in permanent bodies of water, such as lakes, large creeks, and rivers, including the Mississippi and Missouri rivers. Although they live throughout the state — with the exception of northwestern and north central Missouri — they are not easy to find. They tend to remain hidden under rocks and logs until night when they can hunt for food. They eat almost any aquatic creature they can find, including crayfish, small mussels, small fish, worms, and insects.

They are often mistaken for hellbenders. However, mudpuppies are much smaller in size, lack prominent folds of skin along their sides, and retain gills as adults.





Free Fishing Days June 11–12

Get hooked on fishing with the Missouri Department of Conservation's Free Fishing Days June 11 and 12. During Free Fishing Days, anyone may fish in the Show-Me State without buying a fishing permit, trout permit, or trout park daily tag. Normal regulations remain in effect, such as limits on size and number of fish an angler may keep. Special permits may still be required at some county, city, or private fishing areas.

For information on Missouri fishing regulations, permit requirements, fish identification, and more, get a copy of the Department's *2016 Summary of Missouri Fishing Regulations* where permits are sold, at regional offices, nature centers, and online at on.mo.gov/1rdc08g.

If you'd like to find more fish during Free Fishing Days, check out Find MO Fish, the Department's free mobile app. Find MO Fish includes annual fishing prospects, weekly fishing reports, geo-location to find fish-attractor spots, regulations for specific fish species and locations, detailed information on various fish species, and more. Learn more and download Find MO Fish at on.mo.gov/1YQynG9.

Managed Deer Hunt Online Applications Open July 1

Beginning July 1, deer hunters can apply online for a shot at more than 100 managed deer hunts for archery, crossbow, muzzleloading, and modern firearms from mid-September through mid-January at conservation areas, state parks, national wildlife refuges, urban parks, and other public areas. Managed hunts include ones specifically for youth only and for people with disabilities. The managed deer hunt application period is July 1–31. Hunters are selected by a weighted random drawing. Draw results will be available Sept. 1 through Jan. 15. Selected applicants will receive area maps and other hunt information by mail.

Get more information on managed deer hunts and apply starting July 1 at on.mo.gov/1SnXpfl.

Details about managed hunts can also be found in the Department's *2016 Fall Deer & Turkey Hunting Regulations and Information* booklet, available starting in July at regional offices and nature centers, from permit vendors around the state, and online at mdc.mo.gov.

Department Finds New CWD Cases

The Department received final results from its 2015–2016 fall and winter testing of nearly 7,700 free-ranging deer for chronic wasting disease (CWD). Seven were confirmed to be positive for the fatal deer disease. Three were from Adair County, two from Macon County, one from Linn County, and one from Franklin County, which was reported earlier in the year.

The new cases bring the total number of Missouri free-ranging deer that have tested positive

for CWD to 33 since the disease was first discovered in the state in 2010. Of the 33 cases, 21 have been found in Macon County, nine in Adair, one in Cole, one in Franklin, and one in Linn.

Chronic wasting disease infects only deer and other members of the deer family by causing degeneration of the brain. The disease has no vaccine or cure and is 100 percent fatal.

The Department's CWD testing efforts focus mostly on deer harvested by hunters and deer removed by staff and landowners from specific

private properties in northeast, central, and east central Missouri very near where the disease has been found, along with a small number of sick and roadkilled deer.

The Department also conducts broader CWD testing around the state each year as part of its ongoing monitoring efforts. Nearly 2,700 of the deer tested last fall and winter were part of this broader CWD monitoring, and the focus was on the southern half of Missouri. No deer from southern Missouri were found to be positive for CWD.

The Conservation Department has collected more than 51,000 tissue samples for CWD testing from all around the state since it began testing for the disease in 2001.

For more information on CWD in Missouri, visit mdc.mo.gov/CWD.



CONSERVATION COMMISSION ACTIONS

The April Commission meeting featured presentations and discussions regarding the communications update, Grassland Systems Conservation Priorities, information technology projects status report, major construction projects status report, monthly financial summary, Recommendations for 2016–2017 Migratory Game Bird Season Dates and Limits, 2015–2016 Harvest Summary and Recommendations for Rules Pertaining to 2016–2017 Deer Hunting Season, Recommendations for 2017–2020 Duck Zone Boundaries and Season Date Formulas, and an update on chronic wasting disease sampling efforts for fall deer season. A summary of actions taken during the April 28–29 meeting for the benefit and protection of fish, forests, and wildlife and the citizens who enjoy them includes:

- » **Recognized** Private Land Services Division Chief Bill White and PLS staff for their work towards the Department receiving the National Partner Award from Pheasants Forever and Quail Forever for being one of the best such programs in the nation.
- » **Recognized** the staff of Burr Oak Woods Conservation Nature Center for receiving the Outstanding Special Event award from the National Association of Interpreters for the Super Heroes and the Alien Invaders public program.
- » **Approved** the advertisement and sale of 782,233 board feet of timber from 428 acres of Compartment 3, Clearwater Conservation Area (CA) in Reynolds County.
- » **Approved** the advertisement and sale of 935,459 board feet of timber from 268 acres of Compartment 9, University Forest CA in Wayne County.
- » **Approved** the advertisement and sale of 734,820 board feet of timber from 545 acres of Compartment 26, Sunklands CA in Shannon County.
- » **Approved** the advertisement and sale of 844,000 board feet of timber from 330 acres of Compartment 4, Birch Creek CA in Shannon County.
- » **Accepted** the donation of approximately 10 acres in St. Louis County as an addition to the Jean and Joan Goodson CA.
- » **Approved** 2016–2017 migratory game bird season dates and limits.
- » **Approved** rules pertaining to the 2016–2017 deer hunting season.
- » **Approved** 2017–2020 duck zone boundaries and season date formulas.

The next Conservation Commission meeting is June 23–24. For more information, visit on.mo.gov/1li700p or call your regional Conservation office (phone numbers on Page 3).



Commissioners Celebrate National Arbor Day

Missouri Conservation Commissioners and local young conservationists celebrated National Arbor Day on April 29 by planting a native yellowwood tree at Conservation headquarters in Jefferson City. Pictured left to right are Commissioner Dave Murphy, Alex Wilde, Gage Wilde, Commissioner Marilynn Bradford, Commissioner James T. Blair, IV, and Bode Wilde. The yellowwood, a medium-sized tree, attracts a variety of pollinators with its 10–14 inch-long clusters of spring-blooming flowers. The Department encourages people to plant native trees and practice proper tree care. Get information on backyard tree care from the Department's website at on.mo.gov/1Nu8zz2.

(continued from Page 7)

Mandatory CWD Testing in 29 Counties

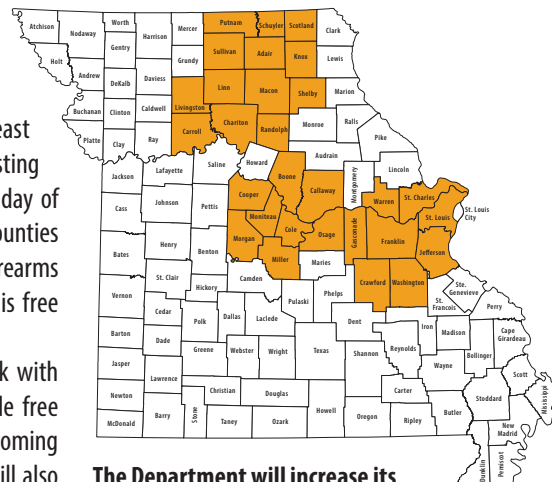
This fall and winter, the Department will increase testing efforts in its CWD management zones. The management zones consist of 29 counties within or that touch a radius of approximately 25 miles from where the disease has been found. Those counties are Adair, Boone, Callaway, Carroll, Chariton, Crawford, Cole, Cooper, Franklin, Gasconade, Jefferson, Knox, Linn, Livingston, Macon, Miller, Moniteau, Morgan, Osage, Putnam, St. Charles, St. Louis, Randolph, Schuyler, Scotland, Shelby, Sullivan, Warren, and Washington.

The Department will require hunters to

present their deer or the head with at least 6 inches of the neck intact for CWD testing at a Department testing location on the day of harvest if it is taken in one of these 29 counties during the opening weekend of the fall firearms deer season, Nov. 12 and 13. The testing is free and hunters can also get free test results.

The Department will continue to work with taxidermists in the 29 counties to provide free CWD testing during other parts of the upcoming deer hunting seasons. The Department will also continue its broader ongoing CWD monitoring efforts with a focus on the northern half of the state for the upcoming season.

For more information on CWD in Missouri, visit mdc.mo.gov/CWD.



The Department will increase its CWD-testing efforts this fall and winter in the highlighted counties (shown in orange).

Frogging Season Begins June 30

The Department encourages Missourians to discover nature this summer — and frogging is a fun way to do it. Frogging season begins June 30 at sunset and ends Oct. 31.

Missouri has two frog species that are legal game — bullfrog and green frog. Bullfrogs are larger and therefore more sought-after. The daily limit is eight frogs of both species combined. The possession limit allows you to have no more than 16 frogs at a time.

Hunt frogs with either a fishing permit or a small-game hunting permit. Children under the age of 16 and Missouri residents 65 or older are not required to have a permit. Those with a fishing permit may take frogs by hand, hand net, atlatl, gig, bow, trotline, throw line, limb line, bank line, jug line, snagging, snaring, grabbing, or pole and line. With a small-game hunting permit, frogs may be harvested using a .22-caliber or smaller rimfire rifle or pistol, pellet gun, atlatl, bow, crossbow, or by hand or hand net. The use of an artificial light is permitted when frogging.

For more information about bullfrog and green frog hunting, visit on.mo.gov/1ruW78z.

New Great Missouri Birding Trail Website Takes Flight

Beginner and seasoned birders can discover nature by exploring the “best of the best” places to watch birds around Missouri. Finding them is as easy as going online to the new website, Great Missouri Birding Trail, at greatmissouribirdingtrail.com.

The website includes maps of the best birding sites around the Show-Me State, along with



WHAT IS IT?

Common Milkweed | *Asclepias syriaca*

The common milkweed blooms from May through August in upland fields, prairies, pastures, glades, and along roadsides and the edges of wooded areas. Its pink or lilac flowers are very fragrant, while its leaves are broad. It usually reaches a height of 3–4 feet, but can grow as tall as 6 feet. Of the 17 species of milkweed found in Missouri, this variety is most commonly seen. The common milkweed is extremely important in conserving the monarch butterfly, whose numbers are plummeting. Adult monarchs lay eggs on milkweeds, and once hatched, the caterpillars eat the milkweed’s foliage. The caterpillars store the milkweed’s toxic sap, making them unpalatable to would-be predators. —photograph by David Bruns

DID YOU KNOW?

We help people discover nature and conserve it, too.

information on various aspects of bird conservation. Pages include birding tips, beginner basics, landscaping for birds, and how to get involved with local bird organizations.

The best birding locations include mostly public land, such as conservation areas and state parks, and cover various types of bird habitats, such as grasslands, woodlands, forests, glades, and savannas. Each type of natural community hosts a different suite of bird species to identify.

The Great Missouri Birding Trail project was started by Mike Doyen of Rolla, president of the Missouri Bird Conservation Foundation. The trail is now a partnership between the Foundation and the Department, with support from other state and federal agencies and birding organizations. The St. Louis and Kansas City sections of the Great Missouri Birding Trail website are complete. Work continues on four remaining sections, including northeast, central, southwest, and southeast, which will be completed in the next few years.

Department to Hold Auction in Salem

The Department will hold a public auction of various used vehicles and equipment on Saturday, June 4, starting at 10 a.m. at its Salem Maintenance Center located at the junction of Highway 72 and Highway 32 in Salem. The auction will include boats, outboard motors, tractors, dozers, farm equipment, and vehicles. View auction items on Friday, June 3 at the Salem Maintenance Center from 8 a.m. to 5 p.m. and preregister starting at 9 a.m. Registration the day of the sale begins at 7:30 a.m. A complete lot listing and terms of sales will be available at the registration desk the day of the auction. Cash, check, and credit/debit cards will be accepted. As required by state statute, the Department must charge a convenience fee to all customers who pay by credit or debit card. For more information, including a list of auction items and procedures, visit mdc.mo.gov/auction.

Don't Move a Mussel

Boaters, anglers, water-skiers, scuba divers, sailors, canoeists, and other types of water recreationists can help prevent the spread of invasive zebra mussels and other aquatic invaders — and keep their own boats and other

Find Outdoor Activities Online

Whether you're looking for a group hike, native-plant landscaping tips, or a nature activity for the kids, you can find conservation programs of all kinds through our online events calendar.

- Browse hundreds of events listed in the whole calendar or choose your region to scan events scheduled at locations near you.
- Event topics include everything from Discover Nature programs, patterning your shotgun, fishing, foraging for wild edibles, map-and-compass, and much more.
- Each event includes location, date, time, program description, and a number to call for more information.
- Some events are open to everyone and require no reservation, while others are limited to certain age groups and/or require registration.

Find events that match your outdoor interests and schedule at mdc.mo.gov/events.



equipment from being fouled — by completing the following steps:

- **Clean:** Remove all plants, animals, and mud and thoroughly wash all equipment, especially in crevices and other hidden areas.
- **Drain:** Eliminate all water before leaving the area, including live wells and transom wells.
- **Dry:** Allow enough time for boats and other equipment to completely dry before launching in other waters.
- **Dispose:** Put unused bait in a trash can.

Zebra mussels are fingernail-sized, black-and-white-striped mollusks that came to North America from Asia. These rapid reproducers are a growing problem in Missouri because they coat boats, docks, and other surfaces, clog pipes, and

harm native species. Overland transport on boats, motors, trailers, and aquatic plants poses one of the greatest risks for spreading zebra mussels. Learn more at on.mo.gov/1MTGQYr. For information about other invasive animals and plants that threaten Missouri's fish, forests, and wildlife, visit on.mo.gov/1TthnUT.

Don't Move Firewood

Camping is a popular outdoor activity this time of year. While packing camping gear and supplies, don't pack firewood! Tree-killing pests such as the emerald ash borer travel in firewood, so get firewood where you camp, and either burn it all before you leave or leave it local. Get more info at bit.ly/1qN3gQQ.



What would it
cost to replace
the free stuff
nature gives us
every day?

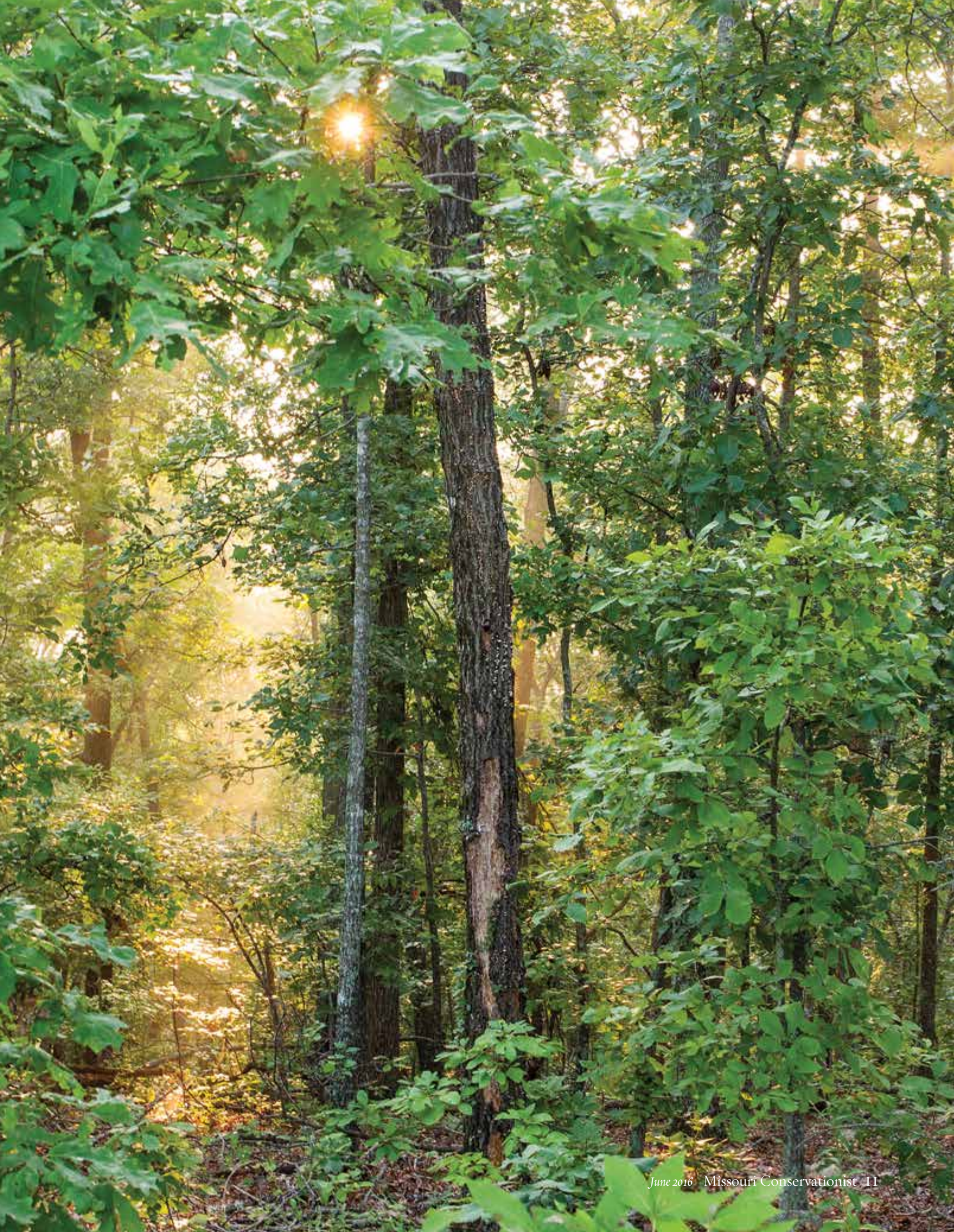
Nature's *true* Value

FREE STUFF IS GREAT. Who doesn't love a free month's worth of cable TV, free Wi-Fi, or a free sundae at the local ice cream shop? It's the kind of thing that makes your whole day, if not your entire week.

Nature has been quietly making our days for millennia. It supplies and purifies our water. It pollinates our food crops. It stores atmospheric carbon, so we have clean air to breathe. Nature provides these and countless other services completely free of charge.

But most of us don't even notice these ecosystem services. Nor do we consider what they're worth or how we can keep them in balance.

BY ISABEAU DASHO AND BOB DISTEFANO



ECONOMICS

Ecosystem services include the natural products and processes we generally can't create for ourselves. Water, breathable air, and pollination, for example. The few services that our advanced technology could manufacture, such as wetland buffers along coastlines, have astronomically high price tags.

To help us understand, appreciate, and conserve nature's services, economists and ecologists got together to identify and appraise the many benefits that nature generously provides.

First, we have to understand the concept of gross domestic product or GDP. Many countries, no matter the size or standing, have economies that produce goods and services. The monetary value of all of these combined is a country's GDP. For instance, according to the United States Bureau of Economic Analysis, America's national GDP in 2013 was \$17.1 trillion. As the world's largest economy, we currently make up about a quarter of the global GDP, which economists put at \$71.83 trillion in 2013.

True Costs of Doing Business

Economists have long calculated the cost of doing business without considering the built-in benefits nature provides. They consider such factors as materials, labor,



Timbered conservation areas like Stegall Mountain provide support services, such as breathable oxygen for people and important nutrients for forest and stream wildlife.



Missouri streams like the Osage River contribute provision services, such as electrical power to our society.

and marketing but not the natural services that support industry. What if there were no bees, butterflies, birds, and bats to pollinate our fruit and vegetable crops? Or no natural water filtration in the forests, soils, aquifers, and wetlands of the Mississippi River watershed?

Together, economists and ecologists estimate that the cost of all the goods and services nature provides to us humans across the planet is \$46 trillion — more than half the global GDP! Imagine building that cost into the price of our food, shelter, clothing, transportation, and energy.

Their message is clear: we cannot afford to live without nature.

Four Groups of Services

How many kinds of services does nature provide? Our understanding of them can be broken down into four main groups.

SUPPORT. This includes such essential services as the building and renewal of soil, the production of atmospheric (breathable) oxygen, pollination, and nutrient cycling.

PROVISIONS. This means the basic necessities of life, such as food for livestock, wildlife, and people. Fibers from wood and other sources make our houses and clothes. And the energy that powers our lives comes from the tapping of fossil fuels like coal and natural gas or from renewable sources such as hydropower from flowing rivers, wind capture, and solar power.

TOP 10 SERVICES AND TIPS FOR TENDING THEM

Natural ecosystems provide more than 20 major ecosystem services. Here are 10 that benefit Missourians and what you can do to sustain them.

1 | WATER SUPPLY
Storage and provision of clean water in rivers, lakes, and aquifers for drinking, bathing, and agricultural and industrial uses

What We're Doing

Providing technical help and cost-share on stream/watershed conservation projects, stream health assessments

What You Can Do

Conserve water at home.

2 | SOIL FORMATION
Creation and revitalizing healthy, productive soils

What We're Doing

Maintaining native prairies and planting cover crops on Department crop fields

What You Can Do

Use conservation farming, forestry, and construction practices.

3 | FOOD PRODUCTION
Production of fish, game, nuts, and fruits (wild and cultivated)

What We're Doing

Managing fish and wildlife populations for sustainable harvest

What You Can Do
Support and practice conservation: maintain or enhance habitat, keep streams clean to maximize fish production.

4 | RAW MATERIALS
Provision of timber, fuel, and forage

What We're Doing

Providing timber production on Department areas and consultation on private lands

What You Can Do

Learn and practice sustainable forestry and grazing.

5 | GENETIC RESOURCES
Provision of unique biological materials to produce medicines and natural resistance to crop pests

What We're Doing

Providing research and management to conserve rare species and biological diversity

What You Can Do

Support public lands, which often serve as reserves for biological diversity.

6 | WASTE TREATMENT
Breakdown and recycling of excess nutrients and toxins, cleansing of water by wetlands

What We're Doing

Providing consultation on stream discharge permits, managing public and private wetlands

What You Can Do

Support and practice wetland conservation. Recycle and dispose of waste chemicals at proper facilities.

7 | EROSION CONTROL
Retention of fertile soils by native grasses and streamside forests

What We're Doing

Providing assistance and cost-share to landowners on stream-bank stabilization, livestock fencing, and watering

What You Can Do

Maintain forested streamside buffers and grassed waterways. Use silt fences on construction projects.

8 | POLLINATION
Production of pollinators for the reproduction of agricultural and natural plants

What We're Doing

Managing for understory pollinators on Department prairies, savannas, woodlands, and wetlands

What You Can Do

Plant native milkweeds and other native flowers that support pollinators throughout their life cycle.

9 | DISTURBANCE REGULATION
Reduction of flood damage via vegetated floodplains and wetlands

What We're Doing

Conserving naturally vegetated floodplains on Department areas for flood prevention

What You Can Do

Don't farm or build in floodplains. Plant and protect forested streamside buffers.

10 | RECREATION
Healthy lands and waters for fishing, hunting, hiking, canoeing, and wildlife viewing

What We're Doing

Providing recreation opportunities on conservation areas statewide

What You Can Do

Practice and support conservation efforts on private and public land.

MODERATION. This includes the processes of waste decomposition, water and air purification, flood control, and climate regulation.

Lastly, and the most difficult to quantify, are **CULTURAL SERVICES.** These include benefits we can feel but not necessarily touch — recreation, aesthetics, and spiritual inspiration. What do we gain by living in a world with the

greater prairie chicken, Niangua darter, and American burying beetle? Or, more importantly, what do we stand to lose if they disappear? We all feel a sense of loss when we see paintings and photos of animals, such as the brilliant green Carolina parakeet, that became extinct in the last hundred years. Sadly, species extinctions continue to accelerate worldwide.

Natural floodplains and wetlands moderate the impacts of floods.

Services Flow From Natural Diversity

In theory, we can live without the Carolina parakeet and other declining species such as the prairie chicken, the Niangua darter, and American burying beetle. But they contribute to our planet's natural diversity. This is the variety and abundance of species and habitat types that contribute to an ecosystem. It turns out natural diversity is essential to the ecosystem services people depend on.

Ecosystems rich in native biodiversity are much more resilient and better equipped to handle change. For example, if a wetland loses one species — a crayfish, say — there may be other kinds of crayfish that could possibly perform the same functions of nutrient cycling, water purification, and soil building, thereby preserving the wetland's ecosystem services. However, widespread, nearly constant impacts like development, soil erosion, water pollution, invasive species, and the over-harvest of fish and wildlife can weaken ecosystems like wetlands until they are unable to perform their services efficiently — or at all.



B.K. Leach Conservation Area

We may not notice if a bird, fish, or beetle disappears from Missouri's landscape, but our grandchildren or their children will.

That's because it can take as long as a generation for the full effects of lost biodiversity to register in our communities. By then the problems — erosion, drought, flooding, loss of native plants and animals, crop failure, catastrophic wildfire — may be very expensive — or impossible — to correct.

This past January we saw historic flooding of the Mera-mec and Mississippi rivers. The National Oceanic and Atmospheric Administration and insurance industry experts estimated that this would be the costliest winter-time flooding event in American history, with the price tag at more than \$1 billion. We are seeing damage partly related to development in and losses of Missouri's natural floodplains. Naturally vegetated floodplains reduce the impacts of floods, another of nature's vital services. Without healthy floodplains, we can expect more historic flooding and more expensive clean-up costs.

Greater prairie chickens



Eastern tiger swallowtail



Niangua darter



Golden crayfish



American burying beetle



Many moving parts must be maintained for an ecosystem to continue providing us with critical services.



Safeguarding the System

Here in Missouri, we benefit from a very low ecological cost of living. Our forests, grasslands, and wetlands naturally filter our water supply. So far, we have enough pollinators to produce our crops without needing to



PLENTY OF HELP FOR HABITAT WORK

Want to reward nature for free services on your land? Identify and conserve your native habitats. If you own rural property, call your county's private land conservationist or resource forester for a consultation. They can help you implement practices that benefit wildlife and achieve your production goals. Find phone numbers for your region on Page 3.

It's hard to put a price on the cultural services provided by nature.

truck in bees from other regions. Our beautiful deciduous forests absorb and store atmospheric carbon, preventing smog days, and they provide untold outdoor recreation. In our state we benefit from every major ecosystem service.

We can keep nature's free goods and services flowing by recognizing and taking care of them. Love butterflies and other pollinators? Plant some native flowers in your yard or garden. If you're grateful for clean water, try conserving more of it in your home, and join a Stream Team. Implement stewardship practices on your farm to reduce erosion, aid soil formation, and produce sustainable forage, timber, and wildlife. Every little thing we do to conserve soil and water, absorb atmospheric carbon, and restore wildlife safeguards the vital ecosystem services we can't live without — and can't afford to replace. ▲

Isabeau Dasho grew up in mid-Missouri, Stream Teaming and chasing crayfish as a Department intern. She now lives in Chicago, pursuing graduate work in public policy and is planning her native plant butterfly garden. Bob DiStefano has worked for the Department for 30 years, conducting research on fisheries and aquatic ecosystems. On his own farm, he manages woodlands for wildlife and timber, restores native prairie, and hunts, hikes, and fishes when time permits.

RIVER WARRIORS

BY BRETT DUFUR
PHOTOGRAPHS BY DAVID STONNER

MISSOURI RIVER RELIEF'S BATTLE
TO RECLAIM THE RIVER





It's a blustery October morning. Liz Doubet and I are on a remote, willow-covered riverbank, hard at work on a River Relief cleanup.

"Dinosaur!" she exclaims. I'm there in a second, and lo and behold, we're looking at the remains of a dinosaur, mostly buried under eons of sand. Sure enough, we can make out its facial features.

Ever since I was a kid, I've dreamed of digging up a dinosaur. But this dinosaur is purple and is made of plastic. I think it's a kid's sandbox.

The brittle purple dinosaur starts to break apart in my hands as we tug against the buried reptile from the *Plasticene* era. Half a dinosaur is better than none, I tell myself. Liz, on the other hand, is determined to get it all, even though trees have taken root on top of it. She starts digging it out with a canoe paddle. As a long-time River Relief volunteer, removing river trash is a personal mission. She is like a warrior on a crusade.

While she shovels frantically, I step back and take stock of the scene. A dozen beached canoes are scattered along a 300-yard wing dike on the Missouri River, just upstream from Eagle Bluffs Conservation Area. Volunteers wrapped in winter garb are combing the banks of this backwater area, which was scouted earlier by River Relief staff.

The spot is inaccessible to their normal "plate boats," which are large aluminum johnboats that can carry tons of trash. This canoe-based cleanup allows volunteers to get higher up into these pockets of trash, where there are lots of old bottles, plastic bags, and dinosaurs.

Once the dinosaur extraction is complete, we head into thicker stands of willow. Every one of us has the giddiness of a treasure hunter, except on this hunt the treasure is trash.

"Check this out!" My 9-year-old daughter, Naomi, discovers a massive, unbroken light bulb, almost the size of her head. Somehow it has floated possibly hundreds of miles and miraculously stayed intact. She holds up a glass soda bottle with equal excitement. I realize she is from a generation of plastic. Glass was mainly from my generation.

River Relief's t-shirt says, "Good, trashy fun," and it's true. All 60 volunteers, along with the River Relief staff,



Volunteers find everything from glass jars to old car bumpers during river relief cleanups.



are out having fun, enjoying a late fall day on the river and the challenge of cleaning up one more pocket of trash.

Everyone is shouting encouragement and sharing finds. The mood is part party and part get 'er done. It is a river rat reunion. Sure, there are newbies, but their spirit and passion are the same.

SINCE 2001, MISSOURI RIVER RELIEF VOLUNTEERS HAVE PULLED 1.7 MILLION POUNDS OF TRASH FROM THE MISSOURI RIVER AND ITS BANKS.



WE ALL LIVE DOWNSTREAM

In 15 years, Missouri River Relief has evolved from a gaggle of river gypsies determined to clean up the river to a well-oiled, seasoned not-for-profit. River Relief was inspired by an early partnership with Chad Pregracke's Living Lands and Waters. Chad inspired a movement that has spawned successful river cleanups on the Missouri, Mississippi, and Ohio rivers.

River Relief focuses its efforts on the Missouri River. Progress is often measured in decades, but out here, progress is measured one discarded water bottle at a time. So far, volunteers have pulled 1.7 million pounds of trash from the Missouri River and its banks. Some of it is predictable, some of it not.

"I'd say the most common items we find are Styrofoam,

single-use plastic bottles, tires, coolers, balls, and flip-flops," says Melanie Cheney, River Relief's assistant program manager. "But we've also found probably 40 to 50 messages-in-a-bottle, three hot tubs, a piano, a Studebaker hubcap, and yes, even the kitchen sink!"



To date, River Relief has conducted more than 150 river cleanups, making a visible and lasting difference in more than 30 river communities. More than 22,500 volunteers have hauled tons of trash from 1,088 river miles. Close to 20,000 students and teachers have taken part in more than 100 river education events. River Relief has also been involved in many water monitoring, planting, and habitat restoration projects.

“Missouri River Relief is a community- and equipment-based nonprofit whose mission is to connect people to the Missouri River through hands-on river cleanups, education events, and stewardship activities,” says River Relief Director Jeff Barrow. “River Relief provides unique opportunities for people to experience the Missouri River up close with the overall goal of restoring this tremendous resource for future generations.”

IT'S NOT JUST ABOUT THE TRASH

River Relief isn't just after your trash. You might say the organization also wants your mind.

“Volunteers love the feeling of accomplishment from seeing an area strewn with trash turn into an immaculate piece of riverbank,” says Steve Schnarr, River Relief's program manager. “Plus, people just love getting out on the river and working with other positive people.”

“I can't tell you how many times I've heard people leave a cleanup saying, ‘I'm never buying a plastic bottle again.’ Part of what we do at a cleanup is help people realize that most of this trash was not dumped right there on the river. Most of it has washed into the river from streets

Volunteers hauled away a multitude of old tires dumped into the river during this outing.



“WE CAN'T PICK UP EVERY PIECE OF TRASH, BUT OUR WORK DOES CAUSE RIPPLES OF CHANGE THAT SPREAD UP AND DOWNSTREAM.”

**—STEVE SCHNARR,
RIVER RELIEF PROGRAM MANAGER**

and communities upstream. It starts in our own backyards. Then people shift from being angry to wanting to change things back home, or to wondering what we can do to change our communities to make things better here on the river.”

The heart and soul of Missouri River Relief is the crew. “It would be impossible to pull all of this off without them,” Steve says. “These are volunteers that put in extra hours and weekends, traveling throughout the river valley to help put on events in a variety of communities.”

“A lot of these folks are attracted to the hands-on work of river cleanup. They are passionate about introducing people to the Missouri River and enjoy the challenges. I think the positive sense of community, even family, is what keeps our crew coming back year after year.”

In addition to hosting events statewide, River Relief also takes part in cleanups in Iowa, Nebraska, and as far away as South Dakota. To volunteer for an event near you this summer or fall, visit riverrelief.org.

THE MISSOURI RIVER: UP CLOSE AND PERSONAL

Most people only get to know the Missouri River by driving over it on a bridge. Taking part in a cleanup changes that perspective forever.

“It's a transformative experience for most folks to get on a boat on the river. That's how you really get a sense of the scale of it. That this is really big nature we are talking about here,” Steve says. “Even just a mile or two from any town on the river, you can feel like you are in a wilderness. I love seeing that change take place over a morning. People can be very apprehensive about getting on a boat in the morning, but they come back two hours



A boatload full of trash was the booty for this River Relief group's voyage.



later with confidence and huge smiles. It recharges me every time I see that.

"I have seen volunteers come to cleanups and walk away inspired to change things in their own community. We can't pick up every piece of trash, but our work does cause ripples of change that spread up and downstream."

THE TAKE-AWAY FROM TRASH

"To a fourth grader, trash is tangible," Steve says. "Watershed conservation might not be. Trash is something a classroom of students can pick up in an afternoon and immediately make a difference. That day might be a kid's most memorable day at school for the entire year."

While students are ankle deep in river gumbo, wrestling old tires and liberating Styrofoam, they are picking up something more lasting than just a discarded tire. They're choosing a future that includes a cleaner river. The moment may soon be forgotten, but for some, it may be the moment they become lifelong conservationists.

BRINGING A CLEAN RIVER MESSAGE TO THE CLASSROOM AND BEYOND

Not all of River Relief's efforts are conducted in rubber boots at the river's edge. The organization has expanded its outreach efforts to bring the river to you. In addition to River Relief's popular speaker series, River Relief's Education Coordinator Kristen Schulte has an ambitious calendar of teacher workshops and events to help bring the river to classrooms and students to the river.

"A recent EPA environmental education grant is helping us build a network of river action teams along the river, conduct a river educator workshop, and host an on-the-river experiential summer camp," Kristen says.

Also in the works is an annual "River Rendezvous" gathering of the Missouri River Action Teams (MoRATs),

MAKING A DIFFERENCE, ONE RIVER AT A TIME

In addition to River Relief, more than 5,200 other Stream Teams statewide are helping Missouri's waterways by picking up trash, monitoring water quality, planting trees, and hosting educational events and water festivals.

Forming a Stream Team is easy and free. Goals include education, stewardship, and advocacy for Missouri streams. The Missouri Stream Team Program is sponsored by the Conservation Department, the Missouri Department of Natural Resources, and the Conservation Federation of Missouri. For more information, call 800-781-1989 or visit Mostreamteam.org or Facebook.com/mostreamteams.

BIG MUDDY SPEAKER SERIES

River Relief's monthly Big Muddy Speaker Series is now being held in Rocheport, Kansas City, and St. Charles. This series, thanks to a partnership with organizations like Greenway Network and Healthy Rivers Partnership, hosts free talks and brings experts together to discuss diverse Missouri River topics, including biology, hydrology, history, and more. For more information, visit bigmuddyspeakers.org.

including race directors, cleanup coordinators, wildlife habitat managers, scientists, and others interested and involved with river issues.

"Our partnership with the EPA also allows River Relief to offer mini-grants to organizations for stewardship, education, and outreach activities. This supports conservation and education all along the Missouri River here and in Nebraska, Iowa, and Kansas," Kristen says.

THE BATTLE FOR TRASH CONTINUES

And so these warriors continue the fight to rid the Missouri River of trash and to promote the message of a cleaner river for future generations. Die-hard River Relief volunteers continue to answer the call. They are joined by more and more schoolchildren each year.

"River Relief, Stream Team 1875, is one of the largest teams in our Stream Team program. They have contributed some of the greatest tonnages of trash collected in the history of the program," says Amy Meier, a Stream Team coordination biologist for the Missouri Department of Conservation. "I am constantly impressed with their wide-ranging approaches and fresh ideas to bring more people to the banks of the Big Muddy. They incorporate art, music, history, and culture into their efforts, which is why they're so successful. Whether they are in big cities, small river towns, or anywhere in between, they always seem perfectly at home."

For the River Relief crew, being at home is being on the river. On any given weekend, they are likely up before dawn, in a fog-filled river bottom, doing a final check on the plate boat before the day's volunteers show up, eager to chip in. They are probably sporting muddy waders and are fueled up on coffee. They know the day's battle plan well. They know that in addition to trash, those volunteers may pick up something bigger — perhaps a new appreciation for a river that has finally found its voice, a river flowing right past their back door. ▲

Brett Dufur is a writer, editor, and avid outdoorsman. He lives in Rocheport.



**Bowhunting frogs is a fun family activity.
Many Department areas offer opportunities
to try the summertime sport.**

by **SCOTT SUDKAMP** // photographs by **DAVID STONNER**

BOWFROGGIN'

Take your archery skills to the water this summer for a hopping good time





W

hether you're an archery deer hunter looking to sharpen your skills for the upcoming season or a skilled frogger looking for a new technique, bowfrogging is worth a try.

The key to shooting success is practice. You can fling thousands of arrows at a target in your yard, but that routine can get old. Nothing hones shooting skills like real hunting, and bowfrogging is ideal for polishing your shooting form and instincts. You'll also enjoy an evening spent in Missouri's great outdoors and the chance to savor golden, crispy frog legs.

GETTING STARTED

You do not need a lot of equipment to start bowfrogging, but there are many accessories available to customize your bow and improve your experience.

Most bowfroggers prefer a bow with a low draw weight, no more than 35 pounds. The shots will be close, so a heavy draw isn't necessary. Longbows, recurves, and compounds will all get the job done, so the type of bow comes down to personal preference. Old recurve bows, often found at bargain prices, make great setups for a night of hunting.

Matt Ormsby, a Department naturalist in St. Charles, is an experienced bowfrogger.

His frogging setup is a compound bow outfitted with a bowfishing reel and barbed fiberglass arrow. This system allows him to retrieve his arrows with ease and greatly reduces the chance of arrow loss. The fiberglass shaft handles rocks easily without bending or breaking, and with the barbed tip, he rarely loses a well-hit frog. Many bowfroggers use standard aluminum or carbon hunting arrows with good results, but when hunting ponds with lots of rocks, consider avoiding aluminum shafts as these often end up bent and unusable.

Arrow tip selection is largely a matter of personal choice, as each has its advantages and drawbacks. Pointed field tips offer the best arrow flight and excellent penetration. They can pin the frog to the bank, so lost frogs are rare. Blunt or bludgeon tips can stun or kill the frog, and their flat tip is less likely to penetrate the bank on misses, making the arrow easier to pull out and less likely to hit a rock below the surface.

TIPS AND TRICKS

Aspiring bowfroggers will need a good light, too. Options include spotlights, headlamps, or stabilizer-mounted lights that shine wherever the bow is aimed. Always carry extra batteries. You can also outfit your arrows with lighted nocks to make them easier to find and retrieve after the shot.

Because bowfrogging takes place mid-summer, a mesh head net and bug spray



Facing page: Lighted fiber optic sights help you see your pins as you line up your shots. **Above:** Many bowfroggers use fiberglass bowfishing arrows with barbed tips, but other options work well, too.



Bullfrogs and green frogs are the only legal frog game species in Missouri.

Frogging season begins June 30 at sunset and runs through Oct. 31. With a hunting permit, hunters may harvest eight frogs per day, with 16 in possession.

should be considered to keep mosquitoes and other flying insects out of your face. Other optional gear that can make the sport more enjoyable include waders, a lighted fiber optic bow sight, and a sack or fish basket for harvested frogs.

Even a large bullfrog is a small target, so if you hope to harvest a mess of frog legs with archery tackle, you should warm up before heading to the water. Shot distance is typically 5–30 feet, so practice your shots at those distances. Whiffle-style golf balls make great targets. Once you're proficient at hitting a golf ball-sized target from various distances, you're ready for a night of fun with the real thing.

WHEN AND WHERE TO GO

Chad Lewis of West Plains is an avid frog hunter who spends many a midsummer's night prowling the edges of ponds for bullfrogs. He's found he has the most success on nights with little or no moonlight.

While shots tend to be close, frogs aren't big targets. Practice at home before hitting the water.



"Moonlit nights make the frogs more jumpy and harder to hunt," said Lewis. "When they know it's easier for predators to see them, they're a lot tougher to hunt and they're less likely to hold still as you approach them."

Lewis wears dark colored clothes to help blend into the dark sky as he stalks the shoreline.

Philip Cooper of Laddonia, another seasoned bowfrogger, agrees that clear, dark nights are best. He's also found that cool, rainy nights usually offer poor hunting, as do high-water conditions. During high water, frogs are more hidden among the vegetation, rather than exposed on the mud banks.

Ponds tend to be favorite spots for many bowfroggers. Ormsby tries to have at least four to five different ponds that he can rotate to avoid burning out a good spot. Both Ormsby and Lewis have found that ponds with few or no fish tend to offer better frogging potential, since tadpoles and young frogs are susceptible to predation. Lewis is careful to limit his harvest to no more than one or two frogs per pond, per trip to ensure plenty are left as breeding stock and to provide opportunity on future trips.

Missouri offers plenty of good places to bowfrog, both on private and public land. In addition to the tens of thousands of private ponds that offer bowfrogging opportunities across Missouri, hunters can also hunt





Department lands. Most conservation areas have at least a few ponds, many of them fishless. Even better, the Department manages thousands of acres of wetlands across the state, and most of these provide habitat ideal for growing and supporting healthy frog numbers. For a list of conservation areas near you, go to nature.mdc.mo.gov.

By the time frog season opens in Missouri, the days are hot and muggy. While frogs can be stalked and hunted during the daytime, most froggers opt to pursue their prey after

dark, offering the chance to be outdoors when conditions are more pleasant. It's a great time to get out and discover nature — and find a few frogs — in the Show-Me State. ▲

Scott Sudkamp has been with the Department since 2002, serving as a wildlife biologist, small game coordinator, and presently as a private land conservationist for Vernon and Bates counties. While he enjoys all types of hunting, he especially enjoys teaching people about Missouri's wildlife and how to manage and care for their land.

Eastern Musk Turtle

LAST YEAR, MY wife, Joyce, and I were on a late-spring hike at Shaw Nature Reserve in Franklin County when she spotted a small turtle basking on a patch of moss next to a lake. At first, I shrugged the critter off as a box turtle, but Joyce urged me to take a closer look. As I approached the turtle, which had a nondescript, domed shell and a striped face and neck, I realized that I was seeing a species I'd never observed before — an eastern musk turtle (*Sternotherus odoratus*) formerly known as a stinkpot.

“Hey, you were right,” I reluctantly called back to Joyce as I knelt for a closer look. “I think it might be a stinkpot.” As I picked up the turtle to examine its features, I noticed the musky odor, a defensive mechanism from which the turtle got both its common and scientific names. I also spotted several fleshy barbels on the skin and neck of the specimen, a key feature of the species.

Although our hike was intended for exercise more than photography, I had thrown my camera and a 300mm lens in my shoulder bag at the last minute. Before long, I was lying in the wet grass, capturing images of this interesting turtle from every angle.

According to *The Amphibians and Reptiles of Missouri* by Tom R. Johnson, the eastern musk turtle is the smallest turtle in Missouri. It's in the Kinosternidae family (mud and musk turtles), which is represented by other small, dull-colored turtles. Johnson describes the stinkpot as semi-aquatic, and I soon learned of its affinity for water when it grew tired of the attention and hightailed it down the shoreline back into the lake. When the commotion was over, Joyce joined me to review the images on my camera, and remind me that she discovered the stinkpot.

Eastern musk turtles are abundant in slow-current sections of rivers and larger streams of the Ozarks, the swamps, sloughs, and small ditches of the Bootheel, and in a few rivers in the northeastern part of the state. They are occasionally found in ponds and lakes, as well. Favored habitat includes shallow water where they often bask on logs, rocks, or small, horizontal tree trunks. Prey includes aquatic insects, earthworms, crayfish, tadpoles, and other small creatures, living or dead.

Eastern musk turtles are active from March to November. Courtship and mating occur from late April through June. Eggs are laid in late June through August, with two to five eggs per female. Eggs hatch in two or three months, and upon hatching young turtles are less than an inch long.

Later in the week, I checked with the Missouri Herpetological Atlas Project, which revealed that Joyce's sighting of the eastern musk turtle, or stinkpot, was the first official record for Franklin County. Elated, she proclaimed her status from that point on as the “Stinkpot Queen.”

—Story and photograph by Danny Brown

 300mm lens +1.4x teleconverter • f/5.6 • 1/100 sec • ISO 400

We help people discover nature through our online Field Guide. Visit on.mo.gov/1M3cWgI to learn more about Missouri's plants and animals.





Robert E. Talbot Conservation Area

From small game hunting to fishing and wildlife viewing, this 4,361-acre area offers a wide array of outdoor activities — all within an hour of Springfield and Joplin.

THIS LAWRENCE COUNTY area lies between upland prairie and open woodlands/savanna, so a variety of birds and plant species can be found here.

Duck hunting is excellent on the area especially during a hard freeze when birds head to the Spring River. A 25-acre wetland on the area also offers hunting opportunities during teal season and migration days.

Anglers can fish on ponds and 2 miles of the Spring River. Managers stock two large ponds periodically with largemouth bass, bluegill, and catfish, and visitors can access them by land or by boat.

The area maintains 10.5 miles of multiuse trails, including the Spring River Nature Trail, which leads to a heron rookery on the southwest portion of the area.

Managers maintain the area's grassland to resemble historical conditions using prescribed burns every two to three years. About 800 of those grassland acres are managed using a fire-grazing interaction known as patch-burn-grazing. Cattle, owned by local ranchers, graze the land to reduce grass dominance, increase wildflower abundance, and provide bare ground-habitat important to a range of grassland-dependent wildlife. The area is a designated quail emphasis area, and bobwhite quail have benefited from the grazing management.

Woodlands are also an important component of the area. Department staff use thinning and burning to create open woodlands that have a rich understory of native grasses and forbs. In fact,



17–40mm lens • f/11 • 1/30 sec • ISO 800 | by Noppadol Paothong

visitors can find some of the best examples of open woodlands in the southwest region on the area.

While managing for historical processes is important, much of the area is still managed with food plot plantings of corn, soybeans, sunflower, milo, and green browse. These plots provide food resources for a variety of wildlife, including doves, turkeys, and deer, and provide predictable areas of animal use.

—Frank Loncarich, area manager



Robert E. Talbot Conservation Area

Recreation Opportunities: Wildlife viewing, bird watching, hunting, fishing, hiking, bicycling, horseback riding

Unique Features: Native grasslands, woodlands, multi-use trails, wetland, and river

For More Information: Call 417-895-6880 or visit mdc.mo.gov/a8037



MDC DISCOVER nature

To find more events near you, call your regional office (phone numbers on Page 3), or visit mdc.mo.gov and choose your region.

KELLOGG LAKE KIDS' FISHING DAY

JUNE 11 • SATURDAY • 8 A.M.–12 P.M.

*Southwest Region, Kellogg Lake,
Carthage, MO 64836*

*No pre-registration required, call 417-629-3423
for more information*

Families, ages 15 and younger may fish

Join us for the 15th Annual Kellogg Lake Kids' Fishing Day. Registration starts at 8 a.m. at the pavilion, and then it's on to the education stations and the freshly stocked lake for a morning of fishing fun. Bring your own pole or borrow one of ours. Bait and basic tackle will be provided.

FATHER'S DAY FISHING — POND TO PLATE

JUNE 18 • SATURDAY • 10 A.M.–1 P.M.

*Southeast Region, Cape Girardeau
Conservation Nature Center, 2289 County
Park Drive, Cape Girardeau, MO 63701*

*Registration required, call 573-290-5218
beginning June 1*

All ages, families

Come celebrate your father (or father figure). We'll spend some of the morning fishing, then try a few fish recipes. Adult supervision required for ages 5–17. Attendees 16 and older must have a valid fishing permit.



WHAT'S GOING ON?: POLLINATOR POWER!

JUNE 18 • SATURDAY • 10 A.M.–2 P.M.

*Central Region, Runge Conservation
Nature Center, 330 Commerce Drive,
Jefferson City, MO 65102*

*No registration required, call 573-526-5544
for more information*

All ages, families

Kick off National Pollinator Week (June 20–26) with activities and discovery tables. Butterflies, bees, and hummingbirds are just a few examples of hardworking animals helping our native plants survive. Guided nature walks start at 11 a.m. and 1 p.m.

INSECTS OF THE PRAIRIE

JUNE 18 • SATURDAY • 10 A.M.–2:30 P.M.

*Kansas City Region, Discovery Center,
4750 Troost Ave., Kansas City, MO 64110*

All ages

Join us to investigate the bountiful prairie insects that can be found in the soil, on plants, and in the air. We'll practice our identification skills, and you'll create insect art to take home with you.



IDEAS FOR FAMILY FUN

DISCOVER NATURE THROUGH MUSIC WITH JOHN NILSEN

JUNE 24 • FRIDAY • 7 P.M.

*St. Louis Region, Powder Valley Conservation
Nature Center, 11715 Cragwood Road,
Kirkwood, MO 63122*

Registration required, call 314-301-1500

Ages 12 and older

Immerse yourself in nature through the music of John Nilsen and the photography of Missouri Department of Conservation photographer Noppadol Paothong. As one of the northwest's largest selling musical artists, John has touched the lives of millions of listeners. John gains inspiration for his music through the beauty of nature.

PRAIRIE DAYS

JUNE 24 AND 25 • FRIDAY AND SATURDAY

*Northwest Region, Dunn Ranch TNC,
16970 West 150th Street, Hatfield, MO
No registration required, call 816-271-3100
for more information*

All ages, families

Camping is available. The two-day schedule includes a Friday night movie at 8:30 p.m., Saturday morning bird hike at 5:30 a.m., prairie festival Saturday from 8 a.m.–3 p.m., and much more.

YOU CERTAINLY CAN CAN

JUNE 25 • SATURDAY • 10 A.M.–2 P.M.

*Ozark Region, Twin Pines Conservation
Education Center, RT 1 Box 1998,
Winona, MO 65588*

*No registration required, call 573-324-1381
for more information*

All ages

Participants will learn how to preserve nature's harvest through canning to enjoy any time of year.



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I Am Conservation

Mike Doyen of Rolla developed a deep appreciation for nature through hunting and fishing with his dad. "Dad had a deep respect for nature and a true ethic of conservation," said Doyen, who decided to put his background in sales and marketing to use by promoting nature and conservation in Missouri. "Over 18 years ago, I organized a group of volunteers from our local Audubon chapter, with the goal of purchasing 70 acres on the south edge of Rolla for a nature center," said Doyen. The result is the Audubon Trails Nature Center. Nine years ago, Doyen started a monthly radio show, "The Backyard Birder," on his local public radio station. "Like the nature center," said Doyen, "my goal is to educate our listeners and get them involved in bird habitat and bird conservation." Doyen's latest venture is the Great Missouri Birding Trail. "Bird conservation begins at home is my byline," said Doyen. Working with the Department and other partner organizations and agencies, Doyen developed a compilation of hundreds of the best publicly accessible birding locations across the state. The purpose of the trail is to give nature lovers a one-stop shop for learning about the best birding spots in the state, as well as to focus attention on conservation efforts that benefit birds and other species. Learn more at greatmissouribirdingtrail.com. —*photograph by David Stonner*